

We Claim:

1. A polymer composition comprising:
water soluble copolymer having functionality including at least
5 sulfonate groups and carboxylate groups; and
alkali metal salt of carboxylic acid.
2. The polymer composition of claim 1 wherein the water soluble
copolymer has a weight average molecular weight of at least 1,000,000.
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3. The polymer composition of claim 1 wherein the water soluble
copolymer has weight average molecular weight between 1,000,000 and
5,000,000.
- 15 4. The polymer composition of claim 1 wherein the water soluble
copolymer is soluble in an amount of at least 4 lbs/bbl in a substantially
saturated brine of alkali metal carboxylate selected from sodium, potassium
and cesium salts of acetic and formic acids.
- 20 5. A polymer composition comprising:
water soluble copolymer formed as the polymerization reaction product
of acrylamidomethylpropanesulfonic acid or salt thereof and alpha, beta-
unsaturated carbonyl compound; and
alkali metal salt of carboxylic acid.
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6. The polymer composition of claim 5 wherein the alkali metal salt of
carboxylic acid is selected from the sodium, potassium and cesium salts of C1
to C3 carboxylic acid.
- 30 7. The polymer composition of claim 5 wherein the alkali metal salt of
carboxylic acid is selected from alkali metal salts of formic acid, acetic acid
and mixtures thereof.

8. The polymer composition of claim 5 wherein the acrylamidomethylpropanesulfonic acid or salt thereof is 2-acrylamido-2-methylpropanesulfonic acid or salt thereof.
- 5 9. The polymer composition of claim 5 wherein the acrylamidomethylpropanesulfonic acid or salt thereof is 2-methyl-2-[(1-oxo-2-propenyl)amino]-1-propanesulfonic acid or salt thereof.
- 10 10. The polymer composition of claim 5 wherein the water soluble copolymer comprises from 5 to 95 wt.% structural units derived from 2-acrylamido-2-methylpropanesulfonic acid or salt thereof, and from 5 to 95 wt.% structural units derived from acrylamide, vinylpyrrolidone, acrylic acid or salt thereof; and
the alkali metal salt comprises at least one alkali metal salt of C1 to C3
15 carboxylic acid.
- 20 11. A polymer composition of claim 10 wherein the water soluble copolymer has 5 to 95 wt.% structural units derived from 2-methyl-2-[(1-oxo-2-propenyl)amino]-1-propanesulfonic acid or salt thereof, and 5 to 95 wt.% structural units derived from 2-propanoic acid or salt thereof.
- 25 12. The polymer composition of claim 10 wherein the alkali metal salt is primarily cesium salt.
13. The polymer composition of claim 11 having 0 to 5 wt.% structural units derived from an at least bifunctional cross-linking agent.
14. The polymer composition of claim 13 wherein the cross-linking agent is N,N'-methylenebis[2-propenamide].
- 30 15. The polymer composition of claim 10 wherein the water soluble copolymer is present in an amount of 0.05 to 5 wt.% of the combined weight

of all solids of the polymer composition and the alkali metal salt is present in an amount of 95 to 99.95 wt.% of the combined weight of all solids of the polymer composition.

5 16. The polymer composition of claim 5 wherein the copolymer is substantially hydrated by water and the alkali metal salt of carboxylic acid is substantially dissolved.

10 17. The polymer composition of claim 16 further comprising alkali metal salt of at least 1 halide.

15 18. The polymer composition of claim 16 wherein the alkali metal salt of at least 1 halide is selected from the sodium, potassium and cesium salts of chloride, bromide and mixtures thereof.

19. The polymer composition of claim 16 developing an apparent viscosity of at least 20 cPs., a plastic viscosity of at least 15 cPs, and a yield point of at least 5 lb./100 ft² when dissolved in cesium formate brine at a concentration of 2 pounds per barrel and measured at 120 degrees F.

20 20. The polymer composition of claim 19 retaining at least 50 percent of its apparent viscosity after roller aging for 30 days at 375 degrees F and measured at 120 degrees F.

25 21. A process for preparing an aqueous polymer composition according to claim 16 comprising hydrating the polymer composition.

30 22. A process for preparing an aqueous polymer composition according to claim 21 wherein alkali metal salt of carboxylic acid is dissolved aqueous composition containing the water soluble copolymer.

23. A process for preparing an aqueous polymer composition according to claim 21 wherein the water soluble copolymer is dissolved in a brine of alkali metal salt of carboxylic acid.
- 5 24. A method of carrying out well-drilling or well-servicing operations comprising the use of an aqueous well service fluid comprising water soluble copolymer having functionality including at least sulfonate groups and carboxylate groups, hydrated in a brine solution.
- 10 25. The method of claim 24 wherein the water soluble copolymer is substantially fully hydrated in the brine solution.
26. An aqueous well service fluid comprising:
water soluble copolymer having functionality including at least
15 sulfonate groups and carboxylate groups, hydrated in a brine solution.
27. The aqueous well servicing fluid of claim 26 wherein the water soluble copolymer is soluble in a brine of alkali metal salt of carboxylic acid.
- 20 28. The aqueous well servicing fluid of claim 26 wherein the water soluble copolymer is substantially fully hydrated in the brine solution.
29. Water soluble copolymer having functionality including at least sulfonate groups and carboxylate groups, which has a weight average
25 molecular weight of at least 1,000,000 and develops an apparent viscosity of at least 20 cPs., a plastic viscosity of at least 15 cPs, and a yield point of at least 5 lb./100 ft² when substantially fully hydrated in cesium formate brine at a concentration of 2 pounds per barrel and measured at 120 degrees F.
- 30 30. Water soluble copolymer of claim 29 having weight average molecular weight between 1,000,000 and 5,000,000.

31. Water soluble copolymer of claim 29 soluble in an amount of at least 4 lbs/bbl in a substantially saturated brine of alkali metal carboxylate selected from sodium, potassium and cesium salts of acetic and formic acids.
- 5 32. Water soluble copolymer of claim 29 which retains at least 50 percent of its apparent viscosity after roller aging for 30 days at 375 degrees F and measured at 120 degrees F.
33. Water soluble copolymer of claim 29 hydrated in a brine solution.
- 10 34. Water soluble copolymer comprising the polymerization reaction product of acrylamidomethylpropanesulfonic acid or salt thereof and alpha,beta-unsaturated carbonyl compound, having weight average molecular weight of at least 1,000,000 and developing an apparent viscosity of at least 20 cPs., a plastic viscosity of at least 15 cPs, and a yield point of at least 5 lb./100 ft² when substantially fully hydrated in cesium formate brine at a concentration of 2 pounds per barrel and measured at 120 degrees F.
- 15 35. Water soluble copolymer of claim 34 wherein the acrylamidomethylpropanesulfonic acid or salt thereof is 2-acrylamido-2-methylpropanesulfonic acid or salt thereof.
- 20 36. Water soluble copolymer of claim 34 wherein the acrylamidomethylpropanesulfonic acid or salt thereof is 2-methyl-2-[(1-oxo-2-propenyl)amino]-1-propanesulfonic acid or salt thereof.
- 25 37. Water soluble copolymer of claim 34 having 5 to 95 wt.% structural units derived from 2-methyl-2-[(1-oxo-2-propenyl)amino]-1-propanesulfonic acid or salt thereof, and 5 to 95 wt.% structural units derived from 2-propanoic acid or salt thereof.
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38. Water soluble copolymer of claim 34 having 40 to 80 wt.% structural units derived from 2-acrylamido-2-methylpropanesulfonic acid or salt thereof and 20 to 60 wt.% structural units derived from acrylamide, vinylpyrrolidone, acrylic acid or salt thereof.

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39. Water soluble copolymer of claim 38 having 0 to 5 wt.% structural units derived from an at least bifunctional cross-linking agent.

37. Water soluble copolymer of claim 34 having 5 to 95 wt.% structural units derived from 2-methyl-2-[(oxo-2-propenyl)amino]-1-propanesulfonic acid or salt thereof, and 5 to 95 wt.% structural units derived from 2-propanoic acid or salt thereof.

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38. Water soluble copolymer of claim 34 having 40 to 80 wt.% structural units derived from 2-acrylamido-2-methylpropanesulfonic acid or salt thereof and 20 to 60 wt.% structural units derived from acrylamide, vinylpyrrolidone, acrylic acid or salt thereof.

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39. Water soluble copolymer of claim 38 having 0 to 5 wt.% structural units derived from an at least bifunctional cross-linking agent.

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